# IFC SADI Agri Sectors

# Value Chain Analysis for

# The NTB Shallot Industry

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# Executive Summary

**NTB Shallot**

Shallots are a relatively profitable but very short term crop grown in rotation with rice at the end of the wet season in some fertile valleys in the Bima area. Apart from assisting with the problems of financing the relatively high value of inputs, (seed, fertiliser, water, weed and pest control etc) the SADI program could seek to research seed varieties and the most economical way to produce propagation materials (bulbs) locally, potentially saving significantly on input costs and improving yields and bulb quality.

There is a potential to better link production with markets elsewhere in Indonesia and further research is required to explore possible linkages between end users / processors (in Java, Kalimantan and Makassar) and co-operative groups which could be developed to improve marketing, buying and financial service activities.

**An Overview of Agribusiness in West Nusa Tenggara (Nusa Tenggara Barat/NTB)**

West Nusa Tenggara comprises the islands of Lombok and Sumbawa to the east of Bali. Lombok, like Bali with its volcanic highlands, attracts a high rainfall in the west and southern areas. The high rainfall coupled with fertile volcanic soils has led to the development of intensive terraced paddy farming systems, where rice rotations are interspersed with crops such as soybean, corn, mung beans and peanuts. Fruit trees and other crops such as Vanilla can be grown on the higher slopes which are more difficult to intensively cultivate, while the drier north eastern side is more suitable for grazing livestock.

Sumbawa Island is larger than Lombok, but of lower overall elevation and attracting less rainfall. Soils vary, but lower fertility and the longer dry seasons inhibit agricultural expansion. The Bima area has the most intensively farmed area, with irrigated paddy fields where shallots have been developed as a profitable, niche option, planted after wet season rice. The balance of the island is relatively lowly populated by subsistence farmers, production being limited by variable soil quality and low rainfall. Sumbawa provides scope for increased grazing livestock production.

Agriculture is the dominant sector in NTB, contributing Rp 3.65trillion (27.04 percent) to the GDP in 2005 where rice production predominates ahead of soybean, corn and mung beans. Tobacco is an established primary estate crop, with 16,766 hectares in production and a potential land area of 170,000 hectares reported to be suitable for tobacco expansion.

Most agricultural products are destined for local domestic consumption, with the local government promoted livestock industry dominating the inter-regional trade. The non agriculture sector which dominates the inter-regional and export trade has been increasing over the past five years, while the fluctuating / declining prices of agriculture commodities in NTB presents challenges to ongoing development.

Fisheries are an important business sector in both islands. Lombok Island with its heavier rainfall has a lot of water resources for fresh water prawn farming activities as an alternative to marine fisheries. Sumbawa Island with its low rainfall is more suited to brackish fishpond development.

The three highest priority commodities in West Nusa Tenggara (based on Analytical Heirachy Process analysis - AHP -) are soybean, beef cattle and shallot. Following IFC / SADI selection processes, this report has analyzed the value chains for three commodities; Peanut, Shallots and Vanilla. The field study was conducted in Lombok Island for Peanut and Vanilla, and Bima Sub District in Sumbawa Island for Shallots.

# 1. Shallot – Attributes

The shallot (*Allium ascalonicum*), is a hardy, bulbous perennial that is closely related to onion and garlic and is probably of Asiatic origin. Its leaves are short, small, cylindrical, and hollow, and it is a mildly aromatic herb of the lily family (Liliaceae).

Although more similar to the onion in appearance, its "bulb" is formed of a cluster of bulbs, in a manner similar to garlic. Its bulbs are used to flavour foods, particularly meats and sauces. There are many different species, mostly suited to cooler climates where a period of "winter dormancy is required.

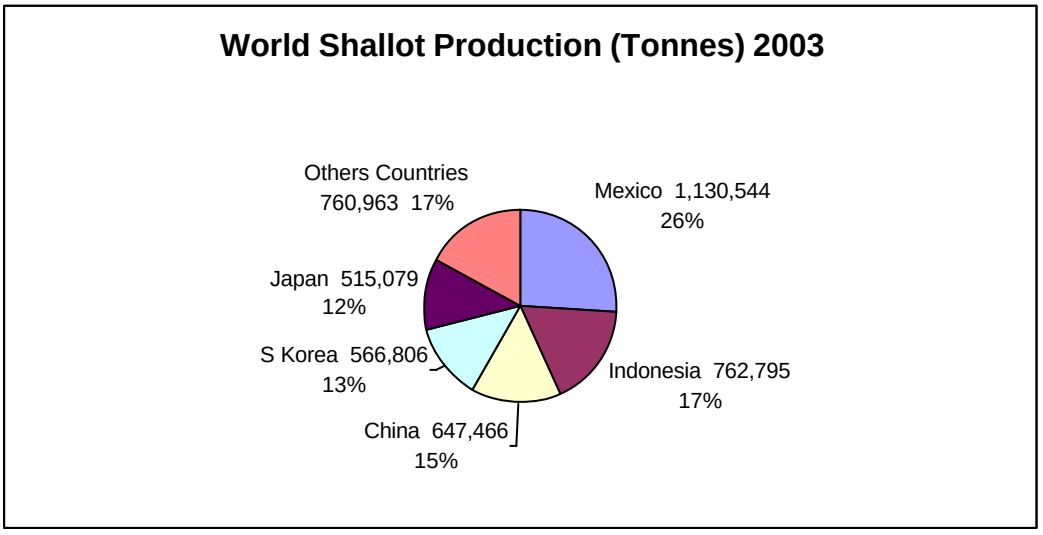
As with onions, raw shallots release irritants to the eye and are known to be particularly high in anti-cancer compounds.

The varieties grown in Indonesia are adapted to tropical conditions and are used extensively in Indonesian cooking, particularly finely sliced and deep fried as a condiment.

# 2. The Global Shallot Sector

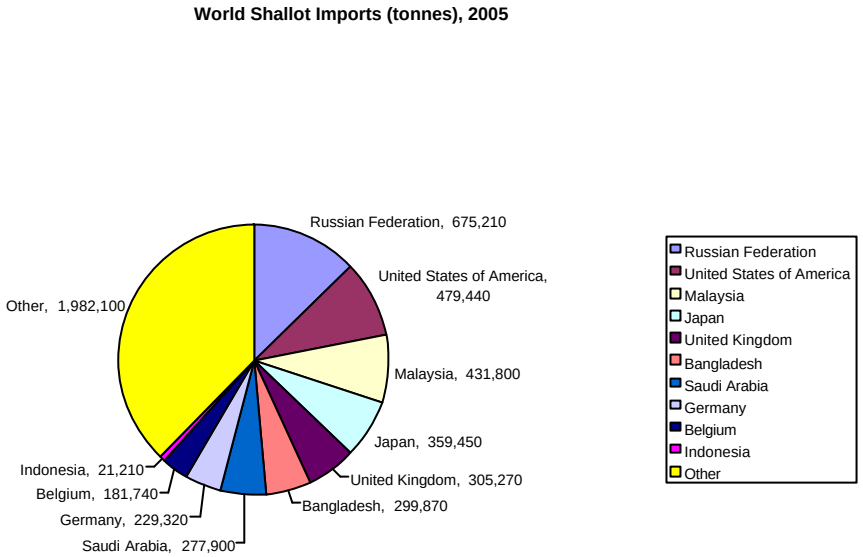
According to the Philippine Government Agri-Business and Marketing Assistance Service, the world production of green shallots in 2003 was 4.383 million tonnes (vs 52.388 tonnes of onions). Shallots are grown in many countries, the largest being Mexico, followed by China, Indonesia (3rd), South Korea and Japan. Although there are some discrepancies between the published figures, the following graphs indicate the general scope of the global sector.

**Figure 1**



Most countries grow shallots for their own consumption. Indonesia imports around 10 percent of the relatively small international trade in Shallots, or approximately 5 percent of its total domestic consumption. It also exports a small amount as the following two charts indicate: [1].

**Figure 2**




## Table 1

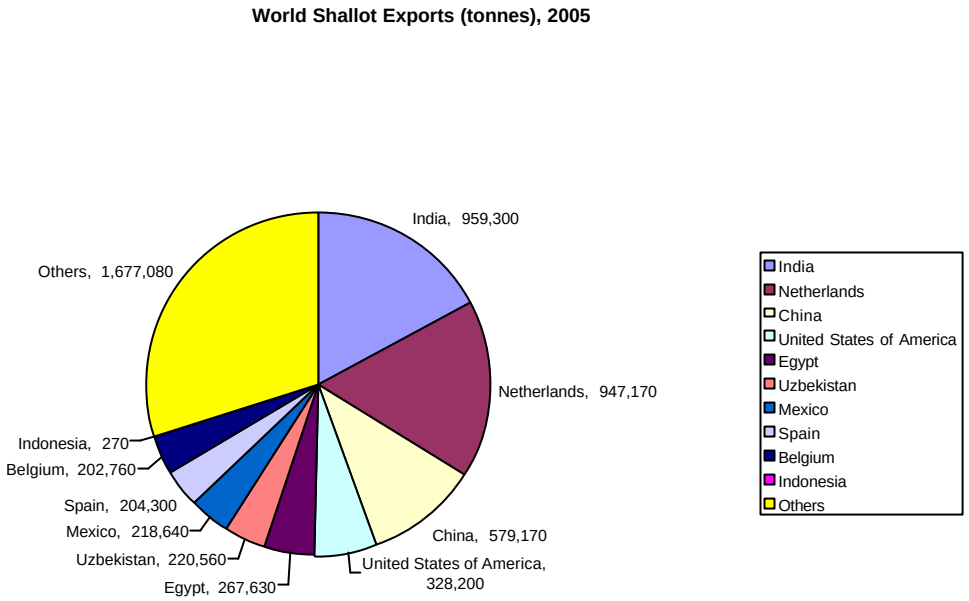
**World Shallot import (tonnes), 2000-2005**

| No | Countries | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | %(2005) | Trend(%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Russian Federation** | 298,200 | 287,720 | 425,770 | 588,310 | 560,610 | 675,210 | 12.88% | 17.33 |
| 2 | **United States of America** | 220,660 | 289,790 | 272,820 | 297,870 | 314,050 | 479,440 | 9.14% | 12.73 |
| 3 | **Malaysia** | 294,030 | 329,240 | 334,270 | 320,710 | 225,990 | 431,800 | 8.24% | 3.24 |
| 4 | **Japan** | 280,950 | 276,640 | 163,220 | 257,680 | 290,450 | 359,450 | 6.86% | 5.56 |
| 5 | **United Kingdom** | 166,880 | 239,870 | 271,020 | 280,130 | 285,450 | 305,270 | 5.82% | 9.27 |
| 6 | **Bangladesh** | 55,270 | 114,950 | 68,550 | 334,520 | 359,590 | 299,870 | 5.72% | 30.91 |
| 7 | **Saudi Arabia** | 139,570 | 133,870 | 191,530 | 162,690 | 202,770 | 277,900 | 5.30% | 13.45 |
| 8 | **Germany** | 249,120 | 274,730 | 269,010 | 282,100 | 279,630 | 229,320 | 4.37% | (0.77) |
| 9 | **Belgium** | 121,600 | 132,080 | 149,150 | 154,060 | 161,880 | 181,740 | 3.47% | 7.52 |
| 10 | **Canada** | 133,690 | 156,430 | 157,530 | 166,130 | 150,590 | 154,500 | 2.95% | 1.77 |
| 11 | **Brazil** | 61,290 | 191,380 | 90,980 | 140,870 | 157,160 | 138,290 | 2.64% | 7.30 |
| 12 | **Sri Lanka** | 126,380 | 114,620 | 133,720 | 134,220 | 120,120 | 131,700 | 2.51% | 0.98 |
| 13 | **United Arab Emirates** | 155,980 | 184,860 | 201,150 | 255,480 | 197,100 | 131,100 | 2.50% | (0.51) |
| 14 | **Netherlands** | 102,360 | 82,700 | 108,460 | 85,380 | 87,350 | 115,770 | 2.21% | 1.71 |
| 15 | **Senegal** | 45,650 | 52,040 | 52,320 | 55,210 | 76,340 | 109,040 | 2.08% | 17.24 |
| 16 | **Indonesia** | 59,620 | 52,080 | 39,780 | 46,610 | 63,940 | 21,210 | 0.40% | (9.06) |
| 17 | **Others** | 1,006,370 | 1,084,340 | 1,110,990 | 1,464,430 | 1,394,420 | 1,201,700 | 22.92% | 5.34 |
| | **Total** | 3,517,620 | 3,997,340 | 4,040,270 | 5,026,400 | 4,927,440 | 5,243,310 | | 7.95 |

Source : FAOSTAT | © FAO Statistics Division 2007 | 29 March 2007

[1] Some discrepancies between import and export figures may be accounted for by the fact that shallots are often processed and added as an ingredient to other foods such as instant noodles, which will be exported under different categories

## Figure 3




## Table 2

**World Shallot exports (tonnes), 2000-2005**

| No | Countries | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | %(2005) | Trend(%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **India** | 343,270 | 441,860 | 605,250 | 860,330 | 833,230 | 959,300 | 18.296% | 19.12 |
| 2 | **Netherlands** | 579,890 | 625,730 | 686,610 | 841,030 | 797,350 | 947,170 | 18.064% | 9.59 |
| 3 | **China** | 190,750 | 323,780 | 287,650 | 506,440 | 466,780 | 579,170 | 11.046% | 18.86 |
| 4 | **United States of America** | 356,620 | 336,890 | 307,330 | 329,550 | 302,690 | 328,200 | 6.259% | (1.94) |
| 5 | **Egypt** | 148,250 | 167,220 | 294,860 | 324,620 | 356,260 | 267,630 | 5.104% | 13.13 |
| 6 | **Uzbekistan** | 49,820 | 26,900 | 71,640 | 77,550 | 95,380 | 220,560 | 4.207% | 33.70 |
| 7 | **Mexico** | 231,110 | 236,390 | 240,020 | 272,490 | 355,100 | 218,640 | 4.170% | 3.60 |
| 8 | **Spain** | 208,750 | 199,400 | 235,480 | 228,080 | 201,240 | 204,300 | 3.896% | (0.32) |
| 9 | **Belgium** | 50,850 | 60,530 | 85,680 | 81,820 | 77,210 | 202,760 | 3.867% | 24.72 |
| 10 | **Poland** | 133,230 | 293,890 | 94,100 | 172,040 | 175,340 | 163,870 | 3.125% | (2.07) |
| 11 | **Argentina** | 157,500 | 218,560 | 250,080 | 208,740 | 224,020 | 163,430 | 3.117% | 0.07 |
| 12 | **New Zealand** | 230,080 | 179,010 | 179,980 | 187,940 | 182,820 | 160,710 | 3.065% | (5.01) |
| 13 | **Malaysia** | 33,810 | 29,270 | 41,670 | 78,940 | 115,180 | 117,520 | 2.241% | 29.38 |
| 14 | **Kazakhstan** | 62,660 | 47,330 | 86,450 | 61,440 | 107,060 | 99,440 | 1.897% | 12.48 |
| 15 | **Turkey** | 87,320 | 164,320 | 152,470 | 140,370 | 75,720 | 85,270 | 1.626% | (7.00) |
| 16 | **Indonesia** | 60 | 10 | 5,690 | 4,540 | 3,850 | 270 | 0.005% | 13.58 |
| 17 | **Others** | 837,910 | 856,240 | 912,920 | 919,460 | 957,410 | 886,840 | 16.914% | 1.77 |
| | **Total** | 3,701,880 | 4,207,330 | 4,537,880 | 5,295,380 | 5,326,640 | 5,605,080 | 106.900% | 8.15 |

Source : FAOSTAT | © FAO Statistics Division 2007 | 29 March 2007

# 3. The Domestic Shallot Sector

Shallots are much used in Indonesian cookery, in addition to being pickled. As a condiment to Asian cuisine, they are not a major food item, but an addition / flavouring. As such, it is not a major Industry, but for the growers involved, shallots offer a viable cropping option within the more intensive farming systems.

Indonesian shallot production is dominated by smallholders growing small areas in rotation with other crops. Most shallots (77 percent) are grown in Java with only 16 percent being grown in the Eastern Region.

**Figure 4**

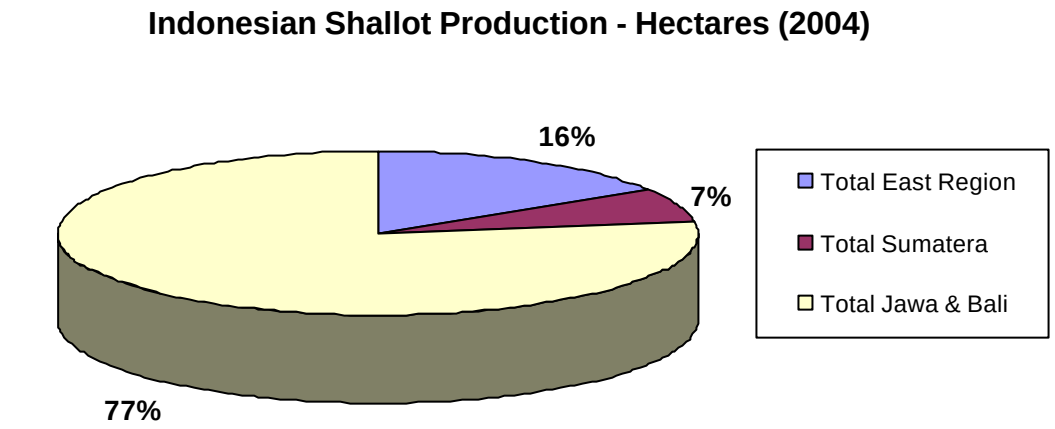



**Figure 5**

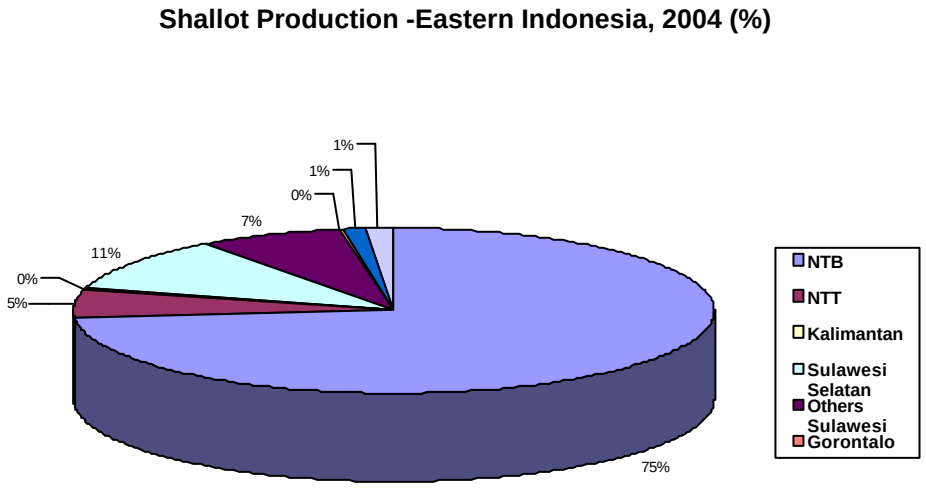


**Table 3**

**Shallot Production (Hectares)**

| *Regions* | *2000* | *2001* | *2002* | *2003* | *2004* | *Growth (%)* | *Proportion (%)* |
|---|---|---|---|---|---|---|---|
| **NTB** | **3,045** | **6,855** | **8,818** | **8,801** | **8,956** | **18.87** | ***62.39*** |
| NTT | 1,208 | 1,013 | 733 | 796 | 1,084 | (4.81) | *7.55* |
| Kalimantan | 15 | 14 | 41 | 35 | 47 | 27.96 | *0.33* |
| Sulawesi Selatan | 5,866 | 3,345 | 4,176 | 2,949 | 2,338 | (19.95) | *16.29* |
| Others Sulawesi | 1,849 | 1,700 | 969 | 1,058 | 1,114 | (15.78) | *7.76* |
| Gorontalo | - | 128 | 21 | 198 | 82 | 27.27 | *0.57* |
| Maluku | 18 | 83 | 133 | 259 | 356 | 50.18 | *2.48* |
| Papua | 61 | 290 | 430 | 153 | 378 | 18.94 | *2.63* |
| **Total East Region** | **12,062** | **13,428** | **15,321** | **14,249** | **14,355** | **3.89** | **16.18** |
| **Total Sumatera** | **7,223** | **5,406** | **5,080** | **5,955** | **5,783** | **(3.96)** | **6.52** |
| **Total Jawa & Bali** | **64,753** | **63,313** | **59,466** | **67,825** | **68,569** | **1.87** | **77.30** |
| **Indonesia** | **84,038** | **82,147** | **79,867** | **88,029** | **88,707** | **1.80** | **100.00** |

**Source : NTB in Figure, Centre Biro of Statistic, 2000-2004**

**Shallot Production (Tonnes)**

| *Regions* | *2000* | *2001* | *2002* | *2003* | *2004* | *Growth (%)* | *Proportion (%)* |
|---|---|---|---|---|---|---|---|
| **NTB** | **21,315** | **103,012** | **91,151** | **82,838** | **77,237** | **12.20** | ***73.68*** |
| NTT | 3,986 | 14,685 | 6,524 | 5,367 | 5,739 | (8.01) | *5.47* |
| Kalimantan | 117 | 62 | 134 | 208 | 223 | 24.06 | *0.21* |
| Sulawesi Selatan | 60,493 | 11,607 | 41,053 | 18,304 | 11,056 | (32.34) | *10.55* |
| Others Sulawesi | 13,774 | 6,269 | 7,389 | 6,831 | 7,682 | (13.85) | *7.33* |
| Gorontalo | - | 860 | 147 | 332 | 192 | (4.70) | *0.18* |
| Maluku | 328 | 3,335 | 389 | 1,154 | 1,291 | (1.96) | *1.23* |
| Papua | 1,830 | 1,448 | 724 | 836 | 1,410 | (11.62) | *1.35* |
| **Total East Region** | **101,843** | **141,278** | **147,511** | **115,870** | **104,830** | **(1.59)** | **13.84** |
| **Total Sumatera** | **71,768** | **43,280** | **43,797** | **44,201** | **43,691** | **(11.19)** | **5.77** |
| **Total Jawa & Bali** | **599,207** | **676,592** | **575,264** | **602,724** | **608,878** | **(0.89)** | **80.39** |
| **Indonesia** | **772,818** | **861,150** | **766,572** | **762,795** | **757,399** | **(1.65)** | **100.00** |

Source : NTB in Figure, Centre Biro of Statistic, 2000-2004

# 4. Size and Structure of NTB Shallot Production

In the Eastern region, NTB has the largest area, mostly centred in a few intensively farmed paddy areas in the vicinity of Bima on Sumbawa Island with a smaller area in Lombok as demonstrated in the following charts:

**Figure 6**

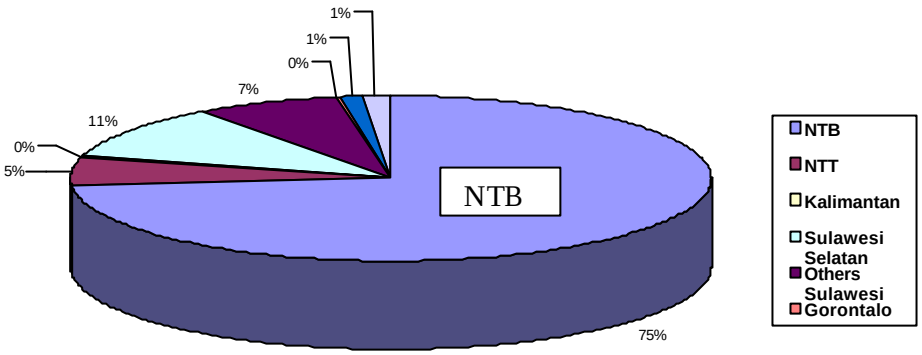
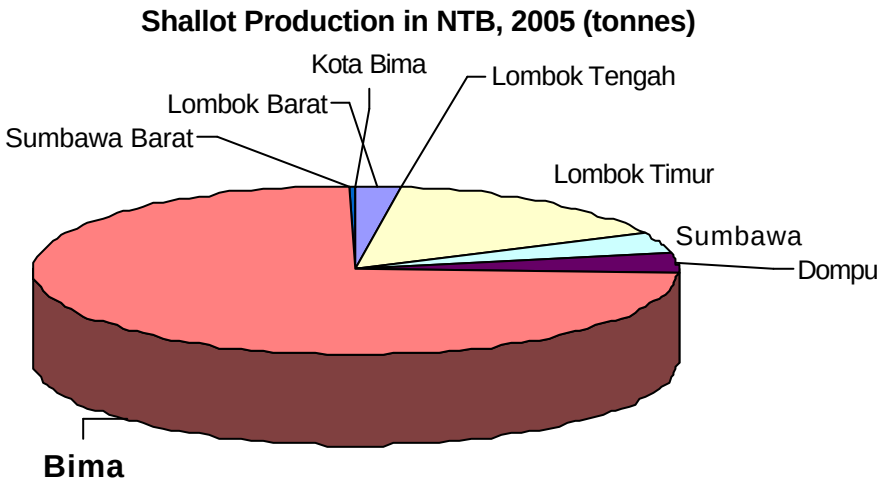



**Figure 7**




The NTB shallot industry is very much a niche operation that has been in existence for as long as the current growers can remember. Who brought shallots to these areas and when was not known by the growers interviewed.

Being a niche industry, there are less traders involved than found in more mainstream activities and a number of growers have organised themselves to ship produce directly to the ready domestic markets as far away as Kalimantan.

A typical scene near Bima –
Intensive Smallholder Rice and Shallots

**Table 4**
**Total Households Cultivating Shallots in NTB by District and Harvested Area, 2003**

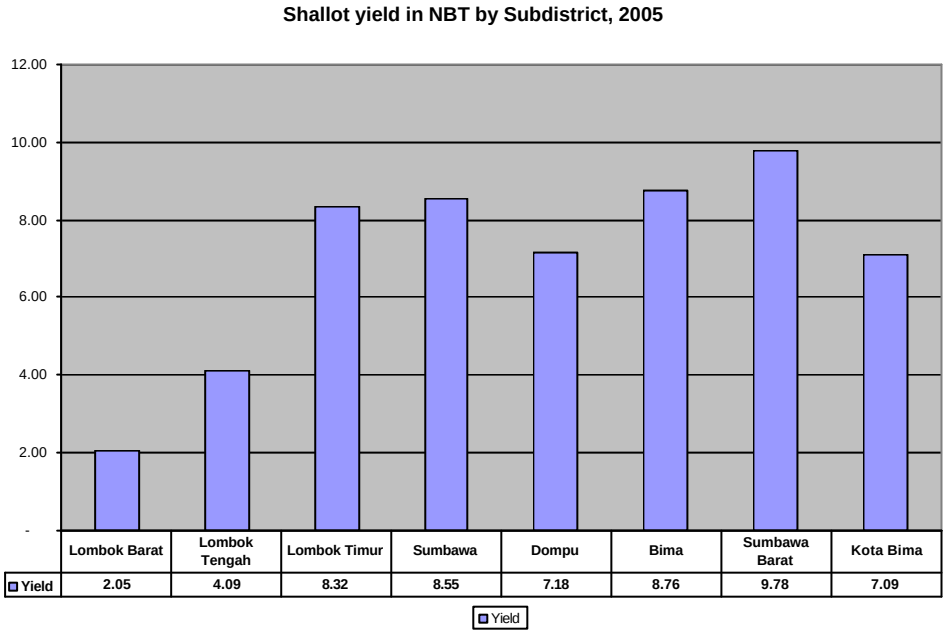
| NO. | KABUPATEN/KOTA | Harvested Area/Year (m2) | | | | | | | | Total Household |
|---|---|---|---|---|---|---|---|---|---|---|
| | | < 600 | 600 s/d 2.099 | 2.100 s/d 3.599 | 3.600 s/d 5.099 | 5.100 s/d 6.599 | 6.600 s/d 8.099 | 8.100 s/d 9.599 | >9.599 | |
| 1 | LOMBOK BARAT | 218 | 431 | 112 | 84 | 33 | 23 | 4 | 43 | 948 |
| 2 | LOMBOK TENGAH | 234 | 70 | 18 | 11 | - | 2 | - | 1 | 336 |
| 3 | LOMBOK TIMUR | 350 | 1,591 | 658 | 340 | 84 | 93 | 29 | 91 | 3,236 |
| 4 | SUMBAWA | 59 | 46 | 20 | 30 | 6 | 7 | 4 | 48 | 220 |
| 5 | DOMPU | 66 | 163 | 65 | 63 | 17 | 11 | 4 | 13 | 402 |
| 6 | BIMA | 710 | 7,148 | 3,691 | 2,423 | 849 | 726 | 236 | 709 | 16,492 |
| 7 | SUMBAWA BARAT | 27 | 3 | 1 | - | - | - | - | - | 31 |
| 8 | KOTA MATARAM | 6 | 3 | - | - | - | - | - | 1 | 10 |
| 9 | KOTA BIMA | 8 | 7 | 1 | 4 | 1 | 1 | - | - | 22 |
| | JUMLAH | 1,678 | 9,462 | 4,566 | 2,955 | 990 | 863 | 277 | 906 | 21,697 |
| | Percentage | 7.73% | 43.61% | 21.04% | 13.62% | 4.56% | 3.98% | 1.28% | 4.18% | 100.00% |

Source : National Centre Biro of Statistic (CBS), Agricultural Census, 2003

# 5 Shallot production and farm productivity

Shallot productivity in Sumbawa is amongst the highest in the country, a function of a suitable location, soils and local expertise developed over many years, with yields averaging from seven to fifteen tonnes per planted hectare according to national agriculture statistics.

**Figure 8**




**Source : Centre Biro of Statistics (CBS) and Directorate General of Food Crops, 2005**

**Table 5**

**Shallot Productivity (Tonnes / hectare)**

| *Regions* | *2000* | *2001* | *2002* | *2003* | *2004* | *Growth (%)* |
|---|---|---|---|---|---|---|
| **NTB** | **7.00** | **15.03** | **10.34** | **9.41** | **8.62** | **(2.35)** |
| NTT | 3.30 | 14.50 | 8.90 | 6.74 | 5.29 | (4.86) |
| Kalimantan | 7.80 | 4.43 | 3.27 | 5.94 | 4.74 | (8.78) |
| Sulawesi Selatan | 10.31 | 3.47 | 9.83 | 6.21 | 4.73 | (12.20) |
| Others Sulawesi | 7.45 | 3.69 | 7.63 | 6.46 | 6.90 | 2.59 |
| Gorontalo | - | 6.72 | 7.00 | 1.68 | 2.34 | (1.01) |
| Maluku | 18.22 | 40.18 | 2.92 | 4.46 | 3.63 | (46.76) |
| Papua | 30.00 | 4.99 | 1.68 | 5.46 | 3.73 | (56.76) |
| **Total East Region** | **8.44** | **10.52** | **9.63** | **8.13** | **7.30** | **(5.30)** |
| **Total Sumatera** | **9.94** | **8.01** | **8.62** | **7.42** | **7.56** | **(6.43)** |
| **Total Jawa & Bali** | **9.25** | **10.69** | **9.67** | **8.89** | **8.88** | **(2.69)** |
| **Indonesia** | **9.20** | **10.48** | **9.60** | **8.67** | **8.54** | **(3.37)** |

**Source : Centre Biro of Statistics (CBS) and Directorate General of Food Crops, 2005**

Shallots grow best in well drained sandy loam soil, planted in raised beds with the top of the bulb remaining visible. They can be propagated from either bulbs or tree seeds. Bulbs are usually preferred because they are easier to establish and have shorter growing period. Small to medium sized bulbs are used for planting, about ¼ of the top part of the bulb is cut off to enhance germination. If grown from true seeds, it must be sown in a nursery and transplanted to the field when the seedlings are 5-6 weeks old.

Shallots are potentially high returning, but relatively high risk, high input crop, requiring dressings of compound fertiliser/s throughout the growing period, weeding and pest / disease control. They must have adequate water during the vegetative and bulbing stages of growth. Dry conditions are required as maturity and harvest approaches to avoid splitting or disease problems, but stopping irrigation too soon will reduce yield.

Mature bulbs are ready for harvest when the tops fall over and the leaves dry up, normally within 60 days of planting (bulbs). The uprooted bulbs are air-dried for 10-14 days, dried leaves cut off, and the outer scale leaves removed. The cleaned bulbs are air dried for another week before storing and selling. In the dried state, the shallot bulbs will keep for approximately four months, but once cut open, shelf life is very limited.

With good management, appropriate inputs and favourable weather conditions, yields in excess of 8 - 9 t/ha can be obtained, but this requires access to working capital and / or good money management to ensure the significant planting and maintenance costs can be met in a timely fashion. Delayed and / or reduced inputs as a result of lack of working capital increases risk of loss due to disease, weed competition and nutrient / water deficiencies.

Higher yields are obtained by using an improved, larger bulbed variety imported from the Philippines. This variety is capable of producing more than 30 percent over the local varieties and is the preferred choice, although the “seed” (bulbs), must be obtained from the Philippines through Surabaya at a significant premium.

Although capable of vegetative propagation, experience is that productivity of the Philippine variety falls off markedly over four years for reasons which are unclear. Possibly this is due to the lighter and poorer quality shallots repeatedly being kept for seed and possibly a disease or nutrient deficiency if grown in the same ground, year to year which is a common but high risk and not recommended practice.

Recommended best practice to reduce pest and disease problems is to grow shallots in rotation with rice and other crops such as maize and soybean which are competitive options to shallots.

The financial advantages of using the Philippine variety over the local variety are compared in the gross margin analysis in section 8. The per hectare gross margins per 1ha of crop are as follows:

-Philippine Variety IDR 31.3 m (+33 percent)
-Local variety IDR 23.4 m

If the cost of propagating materials could be halved through local production, then planting the Philippine variety could theoretically return 60 percent more than the local variety and also be utilised by more farmers due to greater availability.

Best practices include:

- Planting improved (and resistant) disease free cultivars in disease free soils
- Avoid poorly drained soils and plant in raised beds to minimise root rot infections
- Good field sanitation – ie, rotate the crop and destroy culled bulbs and debris and wash all equipment ex harvest to avoid disease build up. Eradicate unwanted plants.
- Avoid prolonged overhead irrigation – ie, reduce leaf wetness for disease control
- Avoid weed competition
- Feed well – ie use appropriate levels of nitrogen fertiliser and irrigation
- Protect plants from injury from machinery, fertilisers and insects
- Allow the tops to mature before harvest
- Promptly and adequately dry bulbs after harvest
- Store bulbs at proper temperature / humidity with adequate ventilation

The critical success factors affecting crop returns are:

- Higher / consistent yields through good management practices ie, timely inputs, irrigation, cultivation, improved propagation materials.
- Improved price for higher grading samples – (larger bulbs)
- Timing of sale.

# 6. Market Conditions

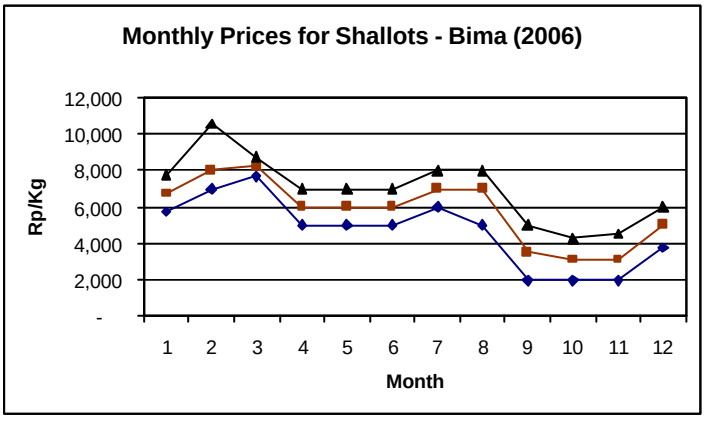
The Bima market is driven by the larger domestic market, and fluctuates in accordance with supply and demand. Bima prices for 2006 are as follows:

**Table 6**

**Shallot Prices in Bima in 2006 (Rp/kg)**

| Month | Farm Gate | Local Trader | Retailer |
|---|---|---|---|
| 1 | 5,750 | 6,750 | 7,750 |
| 2 | 7,000 | 8,000 | 10,500 |
| 3 | 7,625 | 8,250 | 8,750 |
| 4 | 5,000 | 6,000 | 7,000 |
| 5 | 5,000 | 6,000 | 7,000 |
| 6 | 5,000 | 6,000 | 7,000 |
| 7 | 6,000 | 7,000 | 8,000 |
| 8 | 5,000 | 7,000 | 8,000 |
| 9 | 2,000 | 3,500 | 5,000 |
| 10 | 2,000 | 3,125 | 4,250 |
| 11 | 2,000 | 3,125 | 4,500 |
| 12 | 3,750 | 5,000 | 6,000 |
| | 4,677 | 5,813 | 6,979 |

**Figure 9**

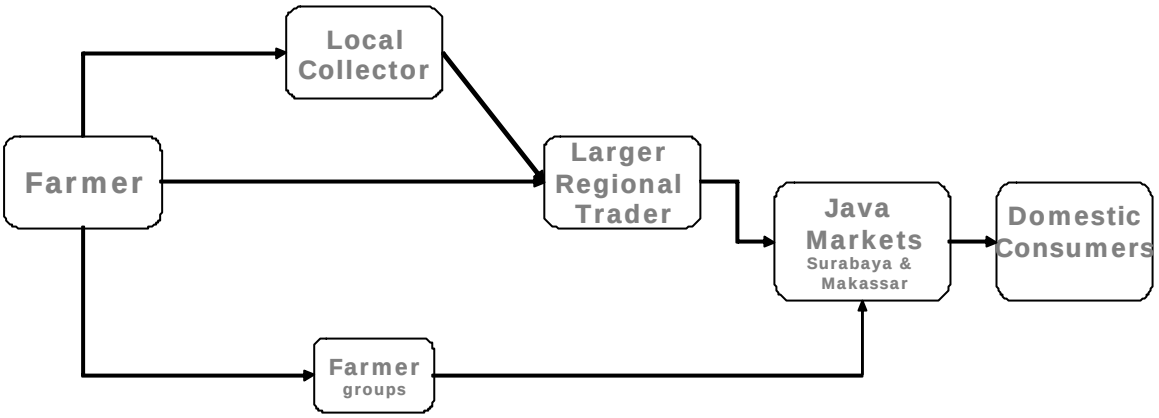



There are no guaranteed market outlets, shipments from traders going to markets in Java, Makassar and Kalimantan as prices and demand dictate. Farmers have been active in shipping product direct to external markets, and there was a strong request by a farmer's group for the provision of better marketing information so they may have greater knowledge as to which market has the greater demand for any given shipment.

The establishment of warehousing facilities could enable farmers to better group and hold product in search of better prices, and to possibly in due course, to establish a warehousing receipt system to enable shallots and other crops to be held for the most suitable markets.

Linkages to food processors elsewhere in Indonesia could possibly provide greater certainty in the market and encourage greater production without reducing over all profitability.

**Figure 10**
**NTB Shallot Supply Chain**




## 7. Shallot Sector Supporting Structures and Organisations

Shallot production a well established niche crop in the intensively farmed area of Bima in Sumbawa and to a lesser extent on Lombok Island. Smallholder road access to ports is relatively good. Barriers to the further development of the shallot sector in NTB include:

- A lack of access by farmers to seasonal finance for the purchase and timely application of the significant up front inputs, particularly propagation materials, fertiliser and agri-chemicals.
- A lack of supply and access to improved varieties to improve crop yields and quality
- Insufficient government research and extension services with regards to best production practices to improve the supply and quality of local production, especially improved varieties and fertiliser recommendations for the different soil types and field fertility levels.

# 8. Shallot Sector Value Chain Costs Analysis

## Table 7

**Smallholder - 1 ha - Producing Local Bima Variety**

| | Unit | Volume | IRD/Unit | IRD | USD | |
|---|---|---|---|---|---|---|
| **Income:** | | | | | | |
| | kg | 9,000 | 4,200 | 37,800,000 | 4,200 | |
| **Total Income** | | | | **37,800,000** | **4,200** | |
| **Production Costs** | | | | | | |
| Land Preparation - tractor | days | 20 | 30,000 | 600,000 | 67 | |
| Land Preparation - mounding | ha | 1 | 120,000 | 120,000 | 13 | |
| Seed | kg | 1,000 | 6,000 | 6,000,000 | 667 | |
| Fertiliser - SP36 | kg | 250 | 1,600 | 400,000 | 44 | |
| Fertiliser - Urea | kg | 300 | 1,200 | 360,000 | 40 | |
| Fertiliser - KCl | kg | 150 | 1,600 | 240,000 | 27 | |
| Pesticides | | | | 1,640,000 | 182 | |
| Fuel for water pump | | | | 1,500,000 | 167 | |
| Labour - Planting | m.days | 20 | 25,000 | 500,000 | 56 | |
| Labour - weeding, spraying, watering | Contract | | | 1,500,000 | 167 | |
| Labour - Harvesting - digging | m.days | 30 | 25,000 | 750,000 | 83 | |
| Labour - Tying & collecting | m.days | 5 | 25,000 | 125,000 | 14 | |
| Labour - meals-total | | | | 595,000 | 66 | |
| **Total Production Costs** | | | | **14,330,000** | **1,592** | **38%** |
| **Gross Profit / Margin per hectare** | | | | **23,470,000** | **2,608** | **62%** |
| **Gross Profit / Margin per kg** | | | | 2,608 | | |

**Smallholder - 1ha - Producing Improved Philippine Variety**

| | Unit | Volume | IRD/Unit | IRD | USD | |
|---|---|---|---|---|---|---|
| **Income:** | | | | | | |
| | kg | 11,000 | 4,700 | 51,700,000 | 5,744 | |
| **Total Income** | | | | **51,700,000** | **5,744** | |
| **Production Costs** | | | | | | |
| Land Preparation - tractor | days | 20 | 30,000 | 600,000 | 67 | |
| Land Preparation - mounding | ha | 1 | 120,000 | 120,000 | 13 | |
| Seed | kg | 1,000 | 12,500 | 12,500,000 | 1,389 | |
| Fertiliser - SP36 | kg | 250 | 1,600 | 400,000 | 44 | |
| Fertiliser - Urea | kg | 300 | 1,200 | 360,000 | 40 | |
| Fertiliser - KCl | kg | 150 | 1,600 | 240,000 | 27 | |
| Pesticides | | | | 1,640,000 | 182 | |
| Fuel for water pump | | | | 1,500,000 | 167 | |
| Labour - Planting | m.days | 20 | 25,000 | 500,000 | 56 | |
| Labour - weeding, spraying, watering | Contract | | | 1,500,000 | 167 | |
| Labour - Harvesting - digging | m.days | 35 | 25,000 | 875,000 | 97 | |
| Labour - tying & collecting | m.days | 6 | 25,000 | 150,000 | 17 | |
| Labour - meals-total | | | | 595,000 | 66 | |
| **Total Production Costs** | | | | **20,385,000** | **2,265** | **39%** |
| **Gross Profit / Margin per hectare** | | | | **31,315,000** | **3,479** | **61%** |
| **Gross Profit / Margin per kg** | | | | 2,847 | | |
| **Gross Profit / Margin per hectare if cost of seed is halved** | | | | **37,565,000** | **4,174** | **73%** |
| **Extra return** | | | | 6,250,000 | **694** | **12%** |

Those farmers producing the best crops are sowing shallots in rotation with paddy irrigated rice. Planting into moist ground after irrigated rice has the following benefits:

- Better plant establishment (higher moisture content in soils)
- Less disease build up (from a change in crop)
- Larger bulb size

At current NTB prices, farmers using good management practices are achieving returns of Rp10 – Rp13 million per hectare, per rice crop. Two rice crops can be sown per year (100 day cycle). One crop of shallots can potentially return as much as two crops of rice, although the risks and inputs are greater. A small holder with two rice crops and one of shallots on one hectare per year can potentially earn an annual gross farm income in excess of Rp 50m (USD 5,500) per hectare. With this potential return, it is difficult without further investigation, to understand the constant request for the need to access working capital to fund inputs such as fertiliser, cultivation and seed etc.

**Bima Trader Business Returns**

Costs and returns for a local Bima trading business is shown below. Here shallots delivered by collectors or bought at the gate are sorted, dried, bagged and shipped to domestic Markets, commonly Makassar, Kalimantan and Java. There are only three traders in this business in Bima and they appear to operate on slim margins. Profitability hinges on astute trading – ie buying price relative to expected market price. Costs are reasonably stable and losses in weight are less than in many other agricultural commodities.

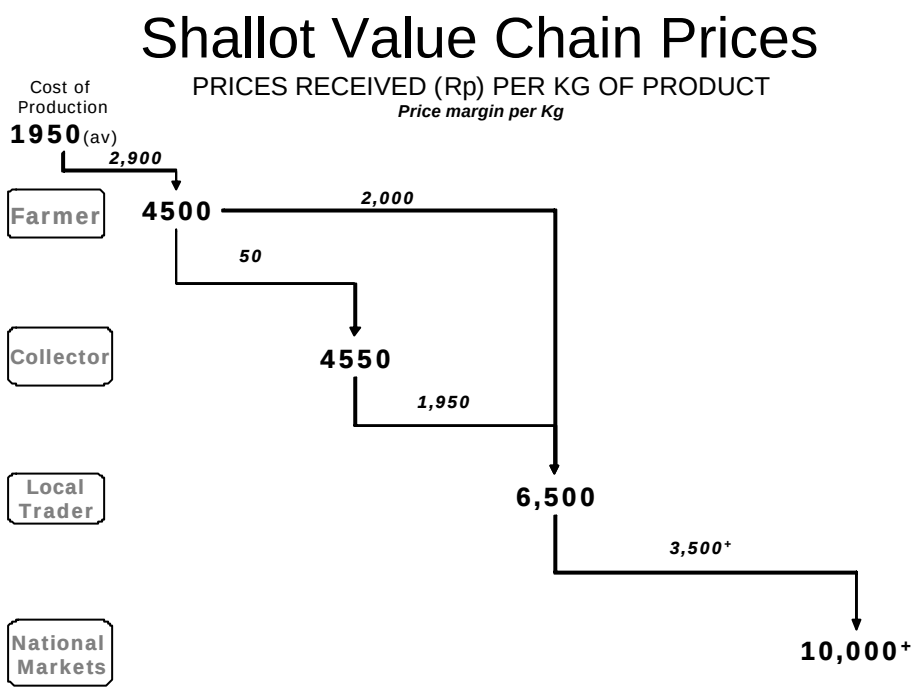
**Table 8**

**Bima Shallot Trader Dry and Sort - per 1000kg**

| | Unit | Volume | IRD/Unit | IRD | USD | |
|---|---|---|---|---|---|---|
| **Income:** | | | | | | |
| Shallots supplied to Kalamantan | kg | 800 | 6,500 | 5,200,000 | 578 | |
| Shallots sold for seed | kg | 100 | 6,000 | 600,000 | 67 | |
| | | 900 | 6,444 | 5,800,000 | | |
| Less Cost of Shallots ex Farmer | Kg | 1,000 | 4,500 | 4,500,000 | 500 | |
| **Gross Income** | | | | **1,300,000** | **144** | 22% |
| **Production Costs** | | | | | - | |
| Labour Costs Drying / Sorting / Packing | kg | 900 | 150 | 135,000 | 15 | |
| Sacks (50kg) | # | 18 | 1,500 | 27,000 | 3 | |
| Storage & Warehouse Overheads | kg | 900 | 200 | 180,000 | 20 | |
| Transport / Inwards - Collection Costs | kg | 1,000 | 50 | 50,000 | 6 | |
| Transport and Loading on Ship Bima | kg | 800 | 150 | 120,000 | 13 | |
| Transport / Shipping to Kalamantan Buyer | kg | 800 | 350 | 280,000 | 31 | |
| **Total Production Costs** | | | | **792,000** | 88 | 14% |
| **Profit per 1000 kg Purchased** | | | | 508,000 | 56 | 39% |
| **Profit per KG purchased.** | | | | 508 | 0.06 | |
| **Production Costs per Kg Purchased** | | | | 792 | 0.00 | |

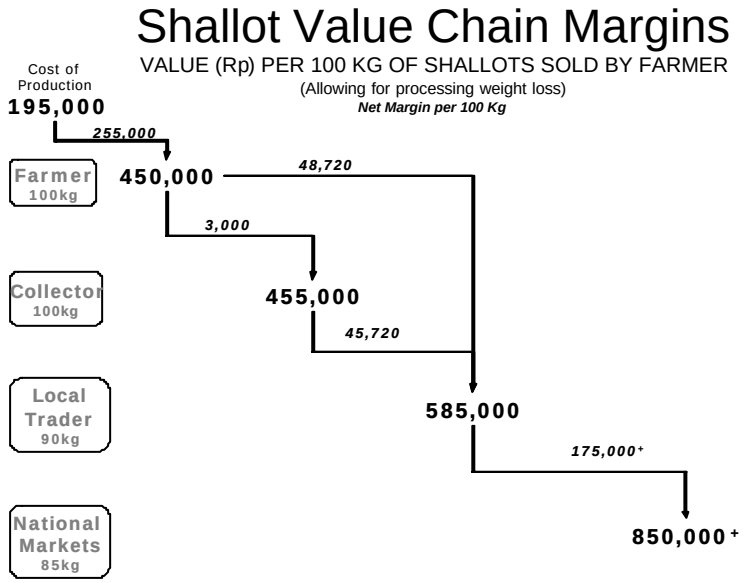
The following diagram demonstrates the market prices received at the various stages of production, and the price margin between each stage as used in the previous economic analysis.

**Figure 11**




The following diagram demonstrates the gross margin actually received at each level, based on the net income received for the (reducing) weight of the processed product sold from an original 100kg of shallots harvested, as per the previous value chain economic analysis

**Figure 12**



# 9 Shallot Product Value Chain Table

| INBOUND LOGISTICS | | |
|---|---|---|
| **Observations** | **Issues** | **Recommended Strategies** |
| **HUMAN RESOURCE MANAGEMENT** | | |
| Small holder technical knowledge of available inputs such as seeds, fertiliser and agri-chemicals, including price and government regulations poor. | Lack of knowledge on the availability and optimum use of improved inputs (e.g., seeds, fertilisers, etc) limits potential yields. | Assist / motivate associated industry stakeholders and the extension services of the Dep. of Ag. to provide training and to establish demonstration farms to demonstrate best practices. |
| **TECHNOLOGY AND DEVELOPMENT** | | |
| Investment and research is required into the need for and optimum use of agri- inputs, esp. the availability of suitable seed and use of fertiliser and chemicals, the optimum timing and application of irrigation water.<br><br>Farmers are unable to sustain production of the superior Philippine seed variety locally. | Inadequate and inefficient application and timing of inputs such as water, fertiliser and sprays limits yield and product quality.<br><br>Use of the higher producing Philippine variety for seed boosts production by over 20 percent | Establish demonstration farms to improve region specific knowledge of input use, cultivar selection and the increased use of organic fertiliser.<br><br>Research the possibility to develop a locally based, improved seed production facility. |
| **PROCUREMENT** | | |
| Farmers complain of difficulty in financing the high input costs.<br><br>Individual farmers have weak bargaining power when purchasing supplies, esp fertiliser. | Insufficient availability of working capital limits the use of necessary inputs, and / or delays application, limiting potential yield<br><br>Many farmers appear unable to retain sufficient cash from the sales of previous crops to provide for the ongoing inputs and become susceptible to advances from traders, limiting market options. | Business training programs focussing on budgeting / cash flow management.<br><br>Access to Finance program for credible farmer groupings – tripartite lending, savings program / facilities to manage cash income ex harvest. Encourage the formation of co-operative buying groups for competitive pricing and local production of superior seed. |

| OPERATIONS (Production) | | |
|---|---|---|
| **Observations** | **Issues** | **Recommended Strategies** |
| **HUMAN RESOURCE MANAGEMENT** | | |
| Most small-holders lack skills and understanding of best farm management practices eg:<br>• Benefits of good land preparation<br>• Timing of inputs, (fertiliser, sprays and esp. water)<br>• Optimum harvest time<br>• Knowledge of optimum commercial farming systems | Lack of understanding of improved practices and subsequent benefits, accentuated by inadequate rewards for improved quality limits production and improvements in quality. | Training through demonstration farms and extension services, supported by suitable leaflets and instructional videos with special emphasis on the efficiency of water use. |
| **TECHNOLOGY AND DEVELOPMENT** | | |
| Smallholders lack direct access to new technologies and developments in best practices, especially in relation to efficient application of water, fertiliser and control of weeds and pests. | Optimum yields and quality is only possible through the development and uptake of best practices in the use of new technologies. | Demonstration farms for local research and extension services for smallholders, including local processing (shelling / grading). |
| **PROCUREMENT** | | |
| Farmers lack adequate knowledge of the most suitable and cost effective inputs, and the importance of correct timing.<br><br>Many families are unable to afford labour saving tools ex cash flow – ie access to tractors and water pumps for irrigation and become reliant on traders if they borrow. | | Demonstration farms and extension services for smallholders.<br><br>Business and financial management skill development associated with improved access to finance. |

| OUTBOUND LOGISTICS | | |
|---|---|---|
| **Observations** | **Issues** | **Recommended Strategies** |
| **HUMAN RESOURCE MANAGEMENT** | | |
| Some farmer groups have been formed to pool product for sale and to deliver direct to external markets, eg. Java. | Encouragement and support is required to motivate improved co-operation between farmers for the benefit of the local industry. | Participative support farmers to establish a more co-operative approach to delivering product to market. |
| **TECHNOLOGY AND DEVELOPMENT** | | |
| Shallots can be stored once dried sufficiently. NTB farmers appear well experienced in sun drying requirements but there seems little research on the efficiencies of what they do nor in quality control during outbound transportation. | Improved efficiencies save costs and maintain product quality. | Research efficiencies in transportation, storage and supply of shallots to the markets. |
| **PROCUREMENT** | | |
| NTB shallot farmers tend to be in reasonably well serviced areas and are able to procure collection of their product as required although efficiencies could be improved and costs reduced through a more co-operative / group approach. | Inefficient collection systems result in higher costs. | A co-ordinated approach to the collection and transportation of product will reduce outbound transport requirements and to force more competition on traders procurement activities.<br><br>Investigate options for warehousing. |

| MARKETING AND SALES | | |
|---|---|---|
| **Observations** | **Issues** | **Recommended Strategies** |
| **HUMAN RESOURCE MANAGEMENT** | | |
| Small-holders lack understanding of linkages between farm practices, costs, margins and market returns. They often lack the ability to withhold crop from sale during the peak harvest times when prices are lower due to the need for quick cash. | Poor understanding of markets, prices and margins and the need to sell quickly for ready cash leads to a weak selling position, easily taken advantage of by traders. | Business, marketing and cash flow management training specifically for smallholder needs.<br><br>Involve IFC Access to Market program? |
| **TECHNOLOGY AND DEVELOPMENT** | | |
| Smallholders lack access to up to date market information, especially Java and other external markets where local produce is sold. | Lack of market information leads to unfair advantage of buyers over smallholders who remain in a weak bargaining position. | Improved technology and methods are required to provide appropriate market information to smallholders through extension services.<br><br>Support the further development of farmer co-operative marketing initiatives.<br><br>Establishment of a Warehouse receipt program to enable better co-ordinated supply to markets and to reduce the need for urgent on farm sale for cash. |
| **PROCUREMENT** | | |
| Smallholders have difficulty receiving correct market signals. | Producers supply products relative to what they are paid for. | Work with buyers / end users to improve market signals favouring best practices for the supply of optimum quality product. |

| SERVICES | | |
|---|---|---|
| **Observations** | **Issues** | **Recommended Strategies** |
| **HUMAN RESOURCE MANAGEMENT** | | |
| Farmers have insufficient knowledge of what services are available. | Progress slowed by lack of access to services. | Extension services to publicise services available and to access and involve industry players to assit them to better service the needs of farmers. |
| **TECHNOLOGY AND DEVELOPMENT** | | |
| Little apparent R&D services available to shallot farmers. | Linkages are required to solve the two way problem with regard to the lack of knowledge of services available and ability of R&D providers to disseminate research information to farmers. | R&D to be enhanced through demonstration farms and associated extension services. Involve local and national Dept of Agriculture. |
| **PROCUREMENT** | | |
| Smallholders have difficulty accessing extension and other services, including finance. | Physical and financial difficulties inhibit progress. | Extension services require adequate resources to take their message to farmers.<br><br>Access to Finance program to help solve cash flow management issues. |

# 10 Summary of Industry Potential, Issues and Recommendations

## 10.1 Summary of Industry Potential

- Shallots are a longstanding, profitable but potentially high risk niche crop in parts of NTB, particularly in the Bima area of Sumbawa, where the farmers have been involved with it for many years.
- Shallot growing is dominated by smallholders owning 1 – 2 hectares, where it is but one crop in the annual farming cycle. Farmer returns could be increased through improved yield and quality, and a reduction in the cost of improved varieties.
- Shallots require capable farmers, experienced in intensive farming. They require irrigation and significant inputs over the short rotation period (60 day cycle).
- The NTB shallot sector is expanding slowly, but must compete with returns from other crops such as maize, soybean and rice
- There is evidence of co-operative and individual farmer initiatives in shipping shallots directly to markets in Java, Kalimantan and Makassar, by passing the small group of local traders.
- There is a significant and growing internal demand for shallots through conventional markets and for increased processing requirements as an ingredient in processed food products such as instant noodles.
- There is a potential IFC investment linkage with the instant food manufacturers.

## 10.2 Summary of Key Industry Issues

- There is insufficient knowledge by smallholder farmers of best practices for optimum production, harvest and post harvest management to maximise product quality.
- Famers request access to more reliable market information so they may better determine which markets will have the best demand / prices for their shipments before they leave Bima.
- Pooling / warehousing facilities would enable farmers to better market their products and reduce the oversupply at peak harvest / lower priced periods.

- Formation of co-operative buying groups should provide better bargaining power for the bulk purchase of inputs such as seed, fertiliser and agri-chemicals.
- Improved seed varieties should be tested and produced at the local level for distribution (sale) to local farmers.
- Inadequate support from government research and extension services to improve the supply and quality of local production results in research knowledge not reaching smallholders.
- A lack of access to finance is the common reason given for the inability to purchase quality planting materials and agri-inputs such as fertilizer and pest / weedicides, in spite of the apparently reasonable annual cash flow potential
- There is a need to understand the individual farmer's overall annual farming system in context with wider community / family needs in a holistic fashion before embarking on any specific shallot farm management improvement program with farmers.

## 10.3 Recommendations for the SADI Program's Next Steps

1. Utilising a wider participative community development approach:
   - Identify a suitable farming community and farm family participants,
   - Determine the best approach to cluster willing farmer groups.
   - Determine all needs and options available to farmers, on and off farm, their overall level of income and the reasons for their common call for better access to finance.

2. To support the clustering of selected farmer groups to:
   - Supply domestic end users (e.g., domestic processors) to improve the efficiency of the shallot value chain and to provide better marketing options.
   - Establish co-operative buying groups
   - Link with appropriate extension and research organisations to improve local management practices.
   - Reduce the need for external workingcapital requirements through a holistic approach to the overall farming system and the provision of business management / farm planning and annual cash flow budgeting training to interested farmers and their families.
   - Develop linkages with local banks / savings and micro loan organisations, including:
   - Group savings and loans schemes, utilising the services of local micro-finance organisations. Ideally this would run in conjunction with a farm

business / cash flow management training program to encourage the deposit of crop sale proceeds into savings accounts and for a commercial management approach to managing its use, in order to minimise the need for working capital.

- Training programs on basic farm business / cash flow management for the selected farming families and rural finance training (where necessary) for the financial institutions linked to the farmers and or any tri-partite lending program.

3. Investigate a possible KDP sub program research project to assess best practices that would include:
   - Best suited varieties
   - Use of seed vs vegetative propagation
   - Optimum fertiliser requirements for local situations
   - Optimum weed and pest control.

   Investigate the possibilities of working with Food Processing companies in Java, Kalimantan and / or Makassar to link, organise and support farmer groups willing to contract to supply.

   This may provide the opportunity to develop a tripartite lending program between the farm group, marketing organisation and bank / financial intermediary to meet both capital development and working capital requirements, guaranteed if possible by both the group and marketing organisation, with loan payments deducted at source from sale proceeds.

Involve DINAS wherever possible to improve long-term services to farmers.